BEFORE THE
PUBLIC SERVICE COMMISSION OF
SOUTH CAROLINA

DOCKET NO. 2019-182-E

In the Matter of:	)	
	)	
South Carolina Energy Freedom Act (H.3659) Proceeding Initiated Pursuant to S.C. Code Ann. Section 58-40-20(C): Generic Docket to (1) Investigate and Determine the Costs and Benefits of the Current Net Energy Metering Program and (2) Establish a Methodology for Calculating the Value of the Energy Produced by Customer-Generators	)	**DIRECT TESTIMONY OF LON HUBER FOR DUKE ENERGY CAROLINAS, LLC AND DUKE ENERGY PROGRESS, LLC**

I. INTRODUCTION AND SUMMARY

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Lon Huber, and my business address is 526 South Church Street, Charlotte, North Carolina.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am the Vice President for Rate Design and Strategic Solutions for Duke Energy Corporation ("Duke Energy"), and I support both Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP") (DEC and DEP are herein referred to collectively as the "Companies").

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I received a Bachelor of Science Public Administration degree in Public Policy and Management from the University of Arizona in 2009 and a Master's in Business Administration from the University of Arizona, Eller College of Management, in 2011. I began my career in the utility industry in 2007 when I started working at a solar energy research institute housed within the University of Arizona. In 2010, I served as a governmental affairs staffer for TFS Solar, a solar photovoltaic ("PV") installation company based in Tucson, Arizona. I was the Regional Policy Specialist for Suntech from September 2011 through December 2012, where I worked to balance cost-effective utility-scale solar with state distributed generation policy goals. From April 2013 to March 2015, I served as a Special Projects Advisor for the Residential Utility Consumer Office in Arizona. From March 2015 to July 2018, I served as the Vice President of Consulting at Strategen Consulting.

I also led Navigant's North American retail regulatory offering from July 2018 through November 2019, where I was responsible for providing expert witness testimony, proceeding strategy, and pricing solutions for clients across the energy sector. Through all of these roles, I worked on net energy metering ("NEM") issues in numerous jurisdictions, which is particularly relevant given that this docket contains a discussion of best practices from other jurisdictions.

I transitioned to my current role with Duke Energy in November 2019. As part of that role, I am responsible for overseeing the development, analysis, and implementation of pricing and rate design. I am also tasked with leading strategies, innovation, and development of new rate designs and product bundles in response to changing electric customer needs in all of Duke Energy's electric jurisdictions.

Q. HAVE YOU TESTIFIED BEFORE THE PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA (THE "COMMISSION") IN ANY PRIOR PROCEEDINGS?

A. I have not testified before the Commission previously.

Q. ARE YOU INCLUDING ANY EXHIBITS IN SUPPORT OF YOUR TESTIMONY?

A. Yes. I have attached my full resumé as **Huber Direct Exhibit 1** to provide additional information regarding my background and experience.

Q. WAS HUBER DIRECT EXHIBIT 1 PREPARED BY YOU OR UNDER YOUR SUPERVISION?

A. Yes, it was.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to aid the Commission in its cost-benefit analysis of the Companies' current NEM programs under Act 236 ("Existing NEM Programs"), as required by S.C. Act No. 62 of 2019 ("Act 62"). Specifically, I will provide the Commission with NEM best-practices from other jurisdictions. I will discuss how these best-practices relate to the Existing NEM Programs and how they can be leveraged by the Commission when implementing the next generation of NEM under Act 62 (the "Solar Choice Program").

II. ACT 62'S REQUIREMENTS

Q. PLEASE EXPLAIN HOW THE NEM BEST-PRACTICES YOU WILL DESCRIBE RELATE TO THE COST-BENEFIT ANALYSIS REQUIRED BY ACT 62.

A. Initially, it is important to note that part of the General Assembly's intent in passing Act 62 was to "build upon the successful deployment of solar generating capacity through Act 236."[1] Act 62 seeks to accomplish this goal, in part, by implementing the Solar Choice Program, which is intended to be a successor to the Existing NEM Programs. In developing this next phase of NEM programs, Act 62 requires that the Commission evaluate the costs and benefits of the Existing NEM Programs. Act 62 specifically enumerates certain items that should be contained in this cost-benefit analysis. Further, on August 26, 2020, the Commission issued a Directive requiring additional considerations for this analysis. Specifically, the Commission

[1] S.C. Code Ann. § 58-40-20(A)(1).

asked the Companies to supplement Act 62's requirements with (i) NEM best-practices "from other utilities and other states, particularly those in the Southeast" and (ii) a 10-year "forecast of solar distributed generation in their service territories." As such, the Companies believe that examining best-practices from various jurisdictions will allow the Commission to analyze trends across the country and inform the Commission's subsequent consideration of the Solar Choice Program.

Q. IS THE COMMISSION'S DIRECTIVE REQUIRING THE COMPANIES TO OUTLINE BEST-PRACTICES CONSISTENT WITH ACT 62?

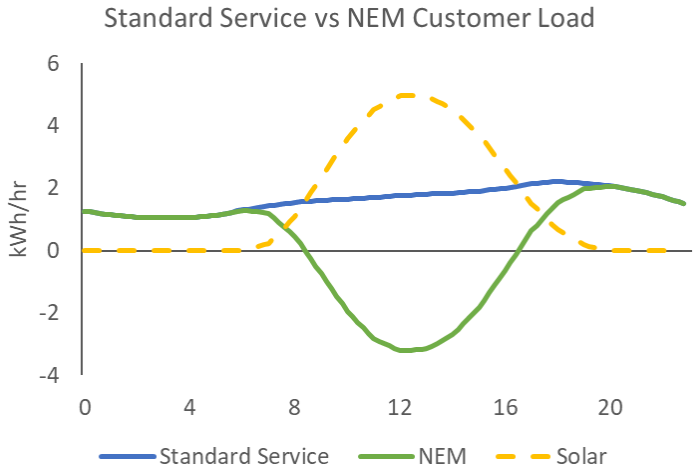
A. Yes. I will later discuss in detail how Act 62 contemplates the exact mechanisms that other jurisdictions have utilized with regard to NEM. Because of this, the Companies believe that the Commission's Directive acts in parallel to Act 62 to ensure that the Solar Choice Program not only builds upon the Existing NEM Programs, but also incorporates proven best-practices utilized in other jurisdictions.

III. USAGE PROFILES OF NEM CUSTOMERS

Q. TO BETTER UNDERSTAND NEM BEST-PRACTICES IN OTHER JURISDICTIONS, PLEASE EXPLAIN HOW NEM CUSTOMERS IMPACT THE GRID.

A. **Figure 1** provides a comparison between the typical load of a residential NEM customer and a residential standard service customer.

Figure 1



The first noticeable difference is the distinct dip in load during midday (i.e., when the PV panels are capturing sunlight) for the residential NEM customer segment caused by increasing production of on-site generation, which reduces their reliance on utility-provided energy. The second noticeable difference is the steep ramp-up of demand for utility-owned generation following the midday dip for the residential NEM customer segment caused by decreasing production (i.e., when the PV panels are capturing less and less sunlight) of on-site generation combined with increasing loads. On the other hand, the average residential standard-service load shape maintains a steady demand profile with less variation from hour-to-hour given that—unlike the NEM customer's load—the standard-service load does not vary with the amount of available sunlight.

Additionally, NEM customers engage in a two-way transaction with the grid that does not occur with non-NEM customers. NEM customers are capable of engaging in this two-way transaction because an NEM customer can produce power

that it sends to the grid, but also can consume power. The most obvious example is that NEM customers export power to the grid when the sun is shining and temperatures are mild. Conversely, NEM customers import power when the sun is not shining. NEM customers import during many peak times and have the same demand as traditional customers during many peak periods and critical peak periods. These are the two most obvious scenarios, but there are also more short-term two-way transactions that occur during daylight hours due to the variable nature of solar generation, and the Companies must be able to follow these NEM customer load requirements in real-time.

Although NEM customers differ in key ways from non-NEM customers, the electric distribution system must be designed, constructed, and operated to provide safe and reliable service to all customers. This includes planning for the maximum demand that all customers, including NEM customers, could place on the system. As such, regardless of the customer's participation in an NEM program, the Companies must build out and plan their systems assuming NEM customers will be consuming power from the Companies during peak time periods—including having personnel, equipment, and facilities in place to serve all customer demands 24 hours a day, 365 days a year. Without an appropriate rate structure in place, the NEM customer would experience a lower bill that would not accurately reflect the Companies' cost to serve such customer. As described above, equitable rate design requires utilities to properly allocate these costs to NEM customers given their decreased electricity bills as a result of on-site generation.

IV. BEST-PRACTICES

Q. HAVE OTHER JURISDICTIONS ADDRESSED THESE INEQUITIES IN THEIR NEM PROGRAMS?

A. Yes. As I describe below, states have engineered NEM successor programs to address these specific cost of service implications and, in doing so, have more accurately allocated costs and provided a more fair rate of return for utilities.

Q. DOES ACT 62 INTEND FOR THE COMPANIES TO ALSO ADDRESS THESE INEQUITIES?

A. Yes. This is most evident in Act 62's requirement that the Companies perform a cost-benefit analysis of the Existing NEM Programs, and mandates that the Commission consider things such as impact of NEM customers on the Companies' long-run marginal costs and cost of service implications. Unlike Act 236, Act 62 also expressly contemplates eliminating unwarranted "cost-shifts" and "subsidizations" (which, as described above, naturally arise from the NEM customer's usage profile) and requires that the next generation of NEM under Act 62 eliminate such "to the greatest extent practicable."[2] Although Witness Harris will describe these components of the cost-benefit analysis in more detail, it is clear that Act 62 places a heightened focus on mitigating the inequities that arise under Existing NEM Programs in contemplating the next generation of NEM.

[2] S.C. Code Ann. § 58-40-20(A)(3).

Q. HOW HAVE OTHER JURISDICTIONS ADDRESSED THE INEQUITIES THAT MAY ARISE FROM TRADITIONAL NEM PROGRAMS?

A. Jurisdictions like Arizona, California, Georgia, Hawaii, Indiana, Louisiana, Massachusetts, Nevada, New Hampshire, New York, Utah, and others have implemented innovative structures to account for the usage profile of NEM customers to more closely align compensation with the cost to serve such NEM customers. To varying degrees, these reforms help alleviate the cost-shifts and subsidizations resulting to other customers. Utilities and regulatory commissions increasingly understand the importance of addressing the challenges associated with NEM rate design. A variety of approaches have been taken to address these challenges, and the implementation of innovative rate designs incorporating time-variant rates—a rate structure specifically envisioned by Act 62—evidences an increasing trend of utilizing these mechanisms to promote NEM programs while also mitigating inequities arising under the same. Time-variant rates—as well as other mechanisms envisioned by Act 62—have been utilized in other jurisdictions via volumetric time-of-use ("TOU") rates, demand charges, minimum bills, grid access fees, and non-bypassables. Each of these mechanisms is aimed at more closely accounting for the cost to serve NEM customers, which aligns with Act 62's directive of aligning "the customer's ability to achieve bill savings with long-term reductions in the overall cost the electrical utility will incur in providing service, including, but not limited to, time-variant pricing structures."[3]

[3] S.C. Code Ann. § 58-27-845(D).

Q. PLEASE BRIEFLY DESCRIBE SPECIFIC EXAMPLES OF THESE BEST-PRACTICES IN OTHER JURISDICTIONS.

A. In evaluating best-practices from other jurisdictions, it is important to note that each jurisdiction contains subtle differences, and the rate design must adequately account for those jurisdictional differences. As I mentioned above, Act 62 specifically envisions "time-variant rates" as a way to align the Companies' costs with the actual cost to serve NEM customers. One type of time-variant rate is a TOU rate. TOU rates have been utilized in a vast majority of states[4] to send appropriate pricing signals to customers, and allow customers to respond to the pricing signals and shift their demand from peak times to off-peak times.[5] For example, in discussing TOU rates offered in Hawaii's NEM program, the Public Utilities Commission of Hawaii noted "significant benefits" of TOU rates given their ability to provide "more effective pricing signals to drive efficient electricity consumption (and production) decisions."[6]

Commissions in both California and Hawaii have approved the use of a minimum bill, while Commissions in Arizona and Georgia have approved grid access fees—all of which reduce the bill impacts to non-NEM customers. Other states, such as New York, New Hampshire, and Massachusetts have incorporated non-bypassables charges. These charges are designed to recover fixed costs of

[4] *See, e.g.*, American Public Power Association, "Rate Design Options for Distributed Energy Resources," November, 2016, https://www.publicpower.org/system/files/documents/ppf_rate_design_options_for_der.pdf ("[TOU rates] are an attractive option because they align utility costs and revenues more equitably.")
[5] *See id*. (Noting that utilities in 48 states maintained some form of TOU Rates in 2016).
[6] *In the Matter of Pub. Utilities, Comm'n*, 325 P.U.R. 4th 339 (Oct. 12, 2015).

public-benefit programs. By structuring these charges in a way that cannot be reduced through the addition of solar generation (i.e. the charges cannot be bypassed or avoided), it ensures NEM customers contribute proportionately to these public-benefit programs.

States have also examined netting periods as part of NEM reforms. Determining the appropriateness of any netting period is a decision that can vary from one utility to the next, and it must be evaluated in conjunction with other "best-practices" to provide an appropriate rate structure. New Hampshire, Indiana, and Nevada utilize monthly netting. Other states employ shorter netting periods. Utah, for example, uses a 15-minute netting period, while Arizona, Hawaii, and Louisiana all net in real-time. Although the above provides a helpful survey, in my opinion, the reform efforts in California and Arizona provide the most broad and instructive insight.

Q. PLEASE EXPLAIN WHY ARIZONA AND CALIFORNIA'S ROOFTOP SOLAR PROGRAMS CAN BE INSTRUCTIVE TO THE COMMISSION.

A. California mandates TOU rates for rooftop solar adopters for the state's investor owned utilities, with the California Public Utilities Commission noting that TOU rates "move the economic contribution of NEM customers toward being more consistent with . . . other customers."[7] In Arizona, the Arizona Corporation Commission found that Tucson Electric Power Company's "proposal to limit the options for new partial requirements DG customers to either a two-part or three-

[7] *Order Instituting Rulemaking to Develop A Successor to Existing Net Energy Metering Tariffs Pursuant to Pub. Utilities Code Section 2827.1, & to Address Other Issues Related to Net Energy Metering*, No. D. 16-01-044, 2016 WL 537768, at *50 (Jan. 28, 2016).

part TOU rate is reasonable . . . [because] TOU rates are an effective and equitable way to incentivize customers to reduce peak demand during the system peak."[8] Finally, both states also have some form of non-bypassable charge to ensure the public benefit program recovery.

Q. ARE THERE DISTINCTIONS BETWEEN THE FEATURES OF SOME OF THE BEST-PRACTICES HIGHLIGHTED ABOVE THAT THE COMMISSION SHOULD CONSIDER IN THIS PROCEEDING?

A. Yes. In Arizona, a grid access fee is assessed to further ensure cost of service alignment with non-NEM customers, while California employs the minimum bill to specifically collect a portion of distribution costs from NEM customers that would not otherwise be recoverable given their decreased electric bills. Therefore, although similar rate mechanisms may be utilized across jurisdictions, it is important to understand the intent behind those mechanisms in determining whether such a mechanism is appropriate in any given jurisdiction.

Q. ALTHOUGH THE COMMISSION REQUIRED BEST-PRACTICES FROM OTHER JURISDICTIONS, ARE THERE ANY PRACTICES CURRENTLY UTILIZED IN SOUTH CAROLINA THAT ARE RELATED TO THE BEST-PRACTICES YOU DESCRIBED ABOVE?

A. Yes. In addition to the rate-making devices above, it is critical to highlight the importance of cutting-edge communications to customers that are geared towards—among other things—Act 62's goal "to reduce or manage electrical

[8] *Opinion and Order (Phase 2)* in Arizona Corporation Commission Docket No E-01933A-15-0239 dated September 20, 2018 https://docket.images.azcc.gov/0000192323.pdf.

consumption from electrical utilities in a manner that contributes to reductions in utility peak electrical demand and other drivers of electrical utility costs."[9] For example, Central Electric Power Cooperative, Inc. has incorporated a peak alert notification system that informs members when a peak day is anticipated. It has also incorporated demand response devices like smart thermostats and wi-fi water heaters to help customers respond to peak events.

On October 1, 2019, DEC began piloting nine dynamic pricing rates in North Carolina that evaluated customer response to critical peak pricing, TOU, and demand charge components. About 3,800 customers enrolled in the program, which is providing insight into how customers respond to more complex pricing signals.

Q. EVEN WITH SUCH CUTTING-EDGE COMMUNICATIONS, IS IT REASONABLE TO EXPECT THAT CUSTOMERS CAN AND WILL RESPOND TO MORE COMPLEX PRICE SIGNALS?

A. Yes. There is a widely-held misconception that customers do not respond to changing electricity prices. This misconception is contradicted by evidence derived from pilot programs and innovative rate offerings over roughly the past two decades. The pilots have found that customers respond positively to price signals regardless of utility or region, that the demand response depends on the ratio of the peak and off-peak prices, that price responsiveness is higher in hotter climates, and that residential customers respond better to dynamic prices than commercial

[9] S.C. Code Ann. § 58-27-845(A)(2).

customers.[10] Additionally, while the results of the DEC North Carolina pilots have not been finalized, a preliminary evaluation of the first six months indicated that a majority of customers were responsive to the price signals.

Q. PLEASE EXPLAIN WHICH BEST-PRACTICES THE COMPANIES BELIEVE ARE MOST APPROPRIATE TO UTILIZE IN THEIR SERVICE TERRITORIES.

A. Initially, it is important to note that although the Companies are aligned in their mission to fulfill the spirit of Act 62 by building upon the Existing NEM Programs and employing certain "best-practices," the overall tariff design within which any best-practice is incorporated must be examined to ensure that it meets the needs we have in South Carolina. TOU rates could accomplish a key goal of Act 62 by more closely aligning utility costs with the cost to serve by sending better price signals to customers than traditional two-part rates. When coupled with rate mechanisms like a minimum bill or demand-based pricing, TOU rates can recover fixed costs while still sending more accurate price signals for both exports and self-consumption without being reliant on complicated load metering and export ratio calculations.

TOU rates also provide customers with the opportunity to have more control over their electricity usage and, subsequently, their electricity bill. Knowing what rates will be charged at set times enables customer to choose when they power-on their appliances to avoid using their appliances during peak hours when prices are

[10] Goutam Dutta & Krishnendranath Mitra, A Literature Review on Dynamic Pricing of Electricity (2017).

highest. This can both reduce customer bills and increase energy efficiency. TOU rates can offer benefits to the utility system as well. As customers respond to the pricing signals sent by the TOU rates, demand can shift from on-peak periods to off-peak periods. This naturally reduces the strain on the energy infrastructure during peak times.

Q. ARE THESE BEST-PRACTICES CONSISTENT WITH THE PARAMETERS SET BY ACT 62 FOR THE SOLAR CHOICE PROGRAM?

A. Yes. Act 62 specifically mentions "time-variant pricing structures"[11]—similar to those discussed above in other jurisdictions—as a way to align a customer's savings with the Companies' cost to serve such customer. As such, it is clear that a goal of Act 62 is to utilize a rate structure similar to those implemented in other jurisdictions to mitigate whatever inequities could arise under the Solar Choice Program.

V. CONCLUSION

Q. DO THE COMPANIES BELIEVE THAT CUSTOMERS WILL CONTINUE TO INSTALL ON-SITE GENERATION?

A. Yes, provided the Companies continue to evolve and roll-out next generations of NEM in-line with innovative approaches utilized in other states and as envisioned by Act 62. The Companies expect that as the costs of installing residential PV systems decrease and reforms such as the above are adopted, the installation of these systems could become more attractive from a financial standpoint. This will

[11] S.C. Code Ann. § 58-27-845(D).

likely result in increased adoption of rooftop solar across the Companies' customer base.

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes, it does.

Lon Huber

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Experience

Vice President – Rate Design and Strategic Solutions
Nov 2019 -
Duke Energy – Charlotte, NC

Director – North American Retail Regulatory Offering
July 2018 – Nov 2019
Navigant Consulting – New York, NY

Vice President – Head of Consulting
MAR 2015 – JULY 2018
Strategen Consulting – Berkeley, CA

Special Projects Advisor
APR 2013 – MAR 2015
Arizona's Residential Utility Consumer Office (RUCO) – Phoenix, AZ

Founder
DEC 2010 – JAN 2014
Next Phase Energy – Tucson, AZ

Manager – Policy Specialist
SEP 2011 – DEC 2012
Suntech America – San Francisco, CA

Finance & Policy Lead
SEP 2010 – SEP 2011
TFS Solar – Tucson, AZ

Congressional Energy Fellow
JAN 2009 – MAY 2009
Washington DC

Policy Program Associate
AUG 2007 – SEP 2010
University of Arizona Research Institute for Solar Energy – Tucson, AZ

EDUCATION

Masters of Business Administration
Eller College of Management, 2011

BS, Public Policy and Management,
University of Arizona, 2009

EDUCATION/CERTIFICATIONS

Instructor – FRI's Transformational rate design course

Microsoft Office Excel Specialist

NARUC Utility Rate School Graduate

AWARDS

Fortnightly Under 40 and Top Innovator Honor Roll – Public Utilities Fortnightly

2018 Innovator of the Year – Utility Dive

The Phil Symons Award – Energy Storage Association

40 under 40 – Arizona Daily Star

Young Alumni Award and Outstanding Professional Staff Member – University of Arizona

Congressional Recognition Award – US House of Representatives